



US009410687B2

(12) **United States Patent**
Hussell et al.

(10) **Patent No.:** **US 9,410,687 B2**
(45) **Date of Patent:** **Aug. 9, 2016**

(54) **LED LAMP WITH FILAMENT STYLE LED ASSEMBLY**

(71) Applicant: **Cree, Inc.**, Durham, NC (US)

(72) Inventors: **Christopher P. Hussell**, Cary, NC (US);
John Adam Edmond, Durham, NC (US); **Gerald H. Negley**, Chapel Hill, NC (US); **Curt Progl**, Raleigh, NC (US); **Mark Edmond**, Raleigh, NC (US); **Praneet Athalye**, Morrisville, NC (US); **Charles M. Swoboda**, Cary, NC (US); **Antony Paul van de Ven**, Hong Kong (CN); **Paul Kenneth Pickard**, Morrisville, NC (US); **Bart P. Reier**, Cary, NC (US); **James Michael Lay**, Apex, NC (US); **Peter E. Lopez**, Cary, NC (US)

(73) Assignee: **Cree, Inc.**, Durham, NC (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 458 days.

(21) Appl. No.: **13/774,078**

(22) Filed: **Feb. 22, 2013**

(65) **Prior Publication Data**

US 2013/0271981 A1 Oct. 17, 2013

Related U.S. Application Data

(63) Continuation-in-part of application No. 13/467,670, filed on May 9, 2012, which is a continuation-in-part of application No. 13/446,759, filed on Apr. 13, 2012.

(60) Provisional application No. 61/738,668, filed on Dec. 18, 2012, provisional application No. 61/712,585,

(Continued)

(51) **Int. Cl.**

F21V 29/00 (2015.01)

F21V 7/00 (2006.01)

(Continued)

(52) **U.S. Cl.**

CPC **F21V 29/22** (2013.01); **F21K 9/135** (2013.01); **F21V 7/00** (2013.01); **F21V 19/003** (2013.01);

(Continued)

(58) **Field of Classification Search**

CPC F21V 21/14
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

3,581,162 A 5/1971 Wheatley
5,463,280 A 10/1995 Johnson

(Continued)

FOREIGN PATENT DOCUMENTS

DE 29923899 U1 4/1999
DE 102007034123 A1 1/2009

(Continued)

OTHER PUBLICATIONS

Cree, Inc., International Application No. PCT/US2013/035400 Invitation to Pay Additional Fees, and, Where Applicable, Protest Fee, Jun. 5, 2013.

(Continued)

Primary Examiner — Joseph L Williams

(74) *Attorney, Agent, or Firm* — Dennis J. Williamson; Moore & Van Allen PLLC

(57) **ABSTRACT**

A lamp has an optically transmissive enclosure and a base. A tower extends from the base into the enclosure and supports an LED assembly in the enclosure. The LED assembly comprises a plurality of LEDs operable to emit light when energized through an electrical path from the base. The tower and the LED assembly are arranged such that the plurality of LEDs are disposed about the periphery of the tower in a band and face outwardly toward the enclosure to create a source of the light that appears as a glowing filament. The tower forms part of a heat sink that transmits heat from the LED assembly to the ambient environment. The LED assembly has a three-dimensional shape. An electrical interconnect connects a conductor to the heat sink where the conductor is in the electrical path between the LED assembly and the base.

20 Claims, 31 Drawing Sheets

